

List of Claims

1. (currently amended) A fuel injector for use in an engine equipped with an engine compression release braking system, comprising:

an injector body with a metallic tip defining ~~at least one~~ a plurality of nozzle outlets and also having an outer surface;

means for protecting said metallic tip from overheating from compression release braking, and said means including a non-metallic insulator attached at a contact with ~~to~~, and surrounding a portion of, said outer surface; and

an outwardly directed centerline from each of said ~~at least one~~ plurality of nozzle outlets does not intersect said insulator.

2. (currently amended) The fuel injector of claim 1 wherein said metallic tip includes a valve seat and a tip centerline;

~~said tip defines a plurality of nozzle outlets; and~~

said insulator covers said outer surface only above a plane that is perpendicular to said tip centerline and positioned between said nozzle outlets and said valve seat.

3. (Original) The fuel injector of claim 1 wherein said non-metallic insulator includes a ceramic material.

4. (Original) The fuel injector of claim 3 wherein said non-metallic insulator is ceramic.

5. (Original) The fuel injector of claim 4 wherein said non-metallic insulator is less than about 3 millimeters thick.

6. (previously amended) The fuel injector of claim 5 wherein said insulator is sufficiently resistant to heat transfer such that the temperature of said valve seat would not reach a tempering temperature if exposed to conditions corresponding to engine compression release braking.

7. (currently mended) The fuel injector of claim 1 wherein said tip includes said valve seat and said centerline;

~~said tip defines a plurality of nozzle outlets;~~

said insulator covers said outer surface only above a plane that is perpendicular to said centerline and positioned between said nozzle outlets and said valve seat;

said insulator includes a ceramic material; and

said insulator is sufficiently resistant to heat transfer such that the temperature of said valve seat would not reach a tempering temperature if exposed to conditions corresponding to engine compression release braking.

8. (previously amended) The fuel injector of claim 1 wherein said insulator is sufficiently resistant to heat transfer such that the temperature of the valve seat does not reach said tempering temperature if exposed to conditions corresponding to simultaneous engine compression release braking and exhaust braking.

9. (currently amended) A method of reducing injector tip overheating due to engine compression release braking, comprising the steps of:

performing engine compression release braking in a engine cylinder
having a fuel injector partially positioned therein;

providing said a fuel injector with a metallic tip having an outer surface;
and

attaching a non-metallic insulator ~~to~~ at a contact with, and surrounding a
portion of, said outer surface, but not intersecting an outwardly directed centerline of ~~at~~
~~least one~~ each of a plurality of nozzle outlets.

10. (currently amended) The method of claim 9 wherein said tip
includes a valve seat and a tip centerline;

~~said tip defines a plurality of nozzle outlets;~~ and

said attaching step includes a step of attaching said insulator to said outer
surface only above a plane perpendicular to said tip centerline, positioned between said
valve seat and said nozzle outlets.

11. (Amended) The method of claim 9 including a step of choosing an
insulating material; and

sizing and attaching said insulating material such that the temperature of said valve
seat does not reach a tempering temperature during engine compression release braking.

12 - 20 (cancelled)

¹²
~~21.~~ (new) An engine comprising:

an engine housing having a cylinder disposed therein;

a fuel injector according to claim 1 attached to said engine housing with ^{said metallic tip} ~~tip~~

~~tip~~ partially positioned in said cylinder; and

an engine compression release brake attached to said housing adjacent said cylinder.

¹³
~~22~~ (new) The engine of claim ~~21~~¹² wherein said insulator is sufficiently resistant to heat transfer such that the temperature of the valve seat does not reach said tempering temperature if exposed to conditions corresponding to engine compression release braking.

¹⁴
~~23~~ (new) The engine of claim ~~22~~¹³ including an exhaust brake operably coupled to an exhaust from said engine.

¹⁵
~~24~~ (new) The engine of claim ~~22~~¹³ wherein said engine compression release brake includes means for performing boosted compression release braking.

¹⁶
~~25~~ (new) The engine of claim ~~22~~¹³ wherein said metallic tip includes a valve seat and a tip centerline; and

said insulator covers said outer surface only above a plane that is perpendicular to said tip centerline and positioned between said nozzle outlets and said valve seat.

¹⁷
~~26~~ (new) The engine of claim ~~22~~¹³ wherein said non-metallic insulator includes a ceramic material.

¹⁸
~~27~~ (new) The engine of claim ~~22~~¹³ wherein said non-metallic insulator is less than about 3 millimeters thick.